to that seen in the normal breast under like influences, and due to a definite chemical constitution of the tumor tissue. It is admitted, however, that in one instance the best growth in the second generation was obtained in a male rat. This almost seems to destroy the only theory offered, and rather to suggest simply the influence of chance in the growth of transplants. Lastly, to the question whether it is easier to bring about by experimental means the transformation of a benign into a malignant tumor than to effect a similar transformation of normal tissue, little can be given. The author suggests that growth energy in benign tumors should be studied with the aim of producing an increase in this quality. Up to the present, the decreased growth energy demonstrated in the transplantation of these tumors gives little encouragement to the prospect of inducing malignant change in benign tumors.

The Inheritability of Spontaneous Tumors of Specific Organs and of Specific Types in Mice. During the past few years, much valuable work has been completed on experimental tumor growth. Mice have been most widely used in this type of study. As a result, certain definite postulates have been established, notably by Slye, who has maintained a large colony of mice of various strains under ideal hygienic conditions for a period extending over ten years. This has facilitated a careful study of the heredity of the animals used and has also produced a rugged stock, capable of living well over the tumor-bearing age. Following these strains, it has been possible to show that tumor development has a persistent tendency to recur in strains where it has been introduced by breeding. This persistence withstands both inbreeding and hybridization. Other strains, non-cancerous, have never developed tumor, either by inbreeding or by hybridization with proved non-cancerous strains. Cancer can be introduced into non-cancerous strains, however, by hybridization with cancerous individuals, and from such crosses it is possible to obtain strains which never produce cancer as well as strains which always do, and which carry it into any strain with which they may be hybridized. Hence, the behavior of mouse cancer in heredity is similar to that of a Mendelian recessive characteristic. Slye (*Jour. Cancer Res.*, 1916, i, 479) now reports some concrete instances of heredity. In a strain of Japanese white-footed mice, which has presented many tumors of all types in addition to the commoner ones of breast and lung, there gradually developed a period of remission in which tumors became rarer, and there were very few of the unusual varieties. As the hybrids of this race began to attain the cancer age, the incidence of tumors of all sorts again became high. As an example primary ovarian tumors may be mentioned. Out of the first 2200 autopsies, there were eight primary ovarian tumors; in the next 4000 no ovarian tumors; and in the last 3000 six primary ovarian tumors. The same is true of liver tumors, where more than half of the whole number obtained has been found in hybrids of the original tumor-bearing strain, only now coming to the tumor-bearing age. The author emphasizes in her report that the inheritability of these tumors is strongly brought out by the fact that while this strain has been subject to exactly the same environment as the others of her stock, nearly all the unusual forms of tumor have come from this one strain. Uterine

tumors, also found in this strain, were a further interesting and striking instance of inheritance of a tumor of specific type in a specific organ. A female, inbred with her brother, gave rise to a strain producing 3 out of the 4 uterine tumors found in the entire group of animals studied in the first 2000 autopsies. Outbred with a male of another group, she obtained a strain producing the only other uterine tumor of the same series of autopsies, and in addition, her direct descendants by both inbreeding and hybridization, headed families producing further uterine tumors. A suggestion substantiating trauma as an etiological factor is given in connection with a curious fibromatous growth, infiltrative in character, which appears on the back and sides, following repeated light scratches, severe enough to result in scarring. An area of baldness develops, followed by an induration which becomes deeper rather than wider. Finally the entire posterior portion of the body undergoes a stiffening, and death results from inability to move to food and water. This form of tumor is inheritable, and has been followed through two successive generations. The author thus claims that tumors of specific organs and specific types are inheritable, and that by selective breeding it is possible to develop a higher percentage of any type of tumor, which may then be carried into another line, free of tumor, and run true to form in the offspring. In another paper (*Jour. Cancer Res.*, 1916, i, 503) the author develops this theme further, in a study of the inheritability of spontaneous tumors of the liver in mice. This type was selected as one which would offer substantial evidence on the influence of inheritance on tumor development as this tumor is not so frequently found as those in the lung and breast, nor is it so rare as to be questioned, as might be the case with tumors of the uterus and stomach. All the liver tumors, including 62 primary and 17 secondary liver tumors, have come from one strain and the animals showing this type of new growth all have an identical ancestry. A few examples will serve to illustrate the manner in which the details have been worked out. A male having an adenoma of the liver, mated to a female with liver tumor, gave a family in which there was a high percentage of liver tumors. The same animal, mated to a female without liver tumor showed no liver tumor in the offspring, though the percentage of tumor in this family was high. Another strain, especially selected to show the inheritability of liver tumor, was sired by a male with a malignant adenoma of the liver. The male offspring constantly showed tumor, though always bred to a female without tumor, and not of the direct line. In the fifth and sixth generation, primary liver tumors again appeared. The data presented appear convincing, especially since outside of the author's stock, but one instance of liver tumor has been reported and in view of the fact that in attaining these results selective breeding has been the only manipulation employed.

On the Etiology of Scarlet Fever. The infecting agent of scarlet fever still baffles the investigator. Periodically researches are undertaken in an attempt to determine the infecting microörganism and often some bacterium is found, which, though satisfying the investigator in his studies, has proved disappointing to others in failing to fulfil the requirements proving it the causative factor of scarlet fever. During 1916 two new microörganisms were offered by independent